2. (Amended) A method of indicating pH levels in an animal, the method comprising:

a) obtaining measurements corresponding to a body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a) which algorithm cumulatively takes account of variations in body temperature over time; and

c) correlating the results of the algorithm with a pH standard.

3. (Amended) The method as claimed in claim 1 wherein ten or more measurements corresponding to body temperature are taken.

4. (Amended) The method as claimed in claim 1 wherein the measurements are taken for a predetermined time period.

5. (Unchanged) The method as claimed in claim 4 wherein the predetermined time period is at least 12 hours.

6. (Amended) The method as claimed in claim 4 wherein the predetermined time period extends up to 24 hours.

7. (Amended) The method as claimed in claim 1 wherein the algorithm is applied at a end of the predetermined time period.

8. (Unchanged) The method as claimed in claim 7, wherein b) further comprises:

determining that animal's average mean temperature reading over the predetermined time period;

calculating the variance between each measurement taken under a) and the mean determined; and

adding all variances to obtain the cumulative temperature variance score.

9. (Amended) The method as claimed in claim 1 wherein the algorithm is applied progressively.

10. (Unchanged) The method as claimed in claim 9 wherein the algorithm is applied progressively as each measurement corresponding to body temperature is taken.

11. (Amended) The method as claimed in claim 9 wherein c) is conducted after each application of the algorithm.

12. (Amended) The method as claimed in claim 1 wherein c) comprises comparing the results of the algorithm to a predetermined threshold and further, in the event of the threshold being exceeded, providing an indication of the threshold being exceeded.

13. (Unchanged) The method as claimed in claim 12 further including setting the animal aside for a predetermined animal withholding period in the event of the threshold being exceeded.

14. (Amended) The method as claimed in claim 9 wherein a mean is calculated progressively as each measurement corresponding to temperature is taken.

15. (Amended) The method as claimed in claim 9 wherein the algorithm comprises:

A6

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1, 0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

16. (Unchanged) The method as claimed in claim 2 wherein an indication of a pH level greater than 5.8 indicates meat of poor quality.

17. (Amended) The method as claimed in claim 1 wherein the measurements are taken on the outer part of the animal's body.

18. (Amended) The method as claimed in claim 17 wherein skin temperature measurements are taken and compensation is provided for at least ambient temperature or solar radiation.

19. (Unchanged) The method as claimed in claim 17 wherein measurements are taken in the ear canal of the animal.

20. (Amended) A method of providing an indication of stress levels in an animal, the method comprising:

a) obtaining measurements corresponding to a body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a) which algorithm cumulatively takes account of variations in body temperature over time; and

c) comparing the results of the algorithm to a predetermined threshold.

21. (Amended) A method of providing an indication of stress levels in an animal, the method comprising:

a) obtaining measurements corresponding to a body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a) which algorithm cumulatively takes account of variations in body temperature over time; and

c) correlating the results of the algorithm with a stress standard.

22. (Amended) The method as claimed in claim 20 wherein ten or more measurements corresponding to body temperature are taken.

23. (Amended) The method as claimed in claim 20 wherein the measurements are taken for a predetermined time period.

24. (Unchanged) The method as claimed in claim 23 wherein the predetermined time period is at least 12 hours.

25. (Amended) The method as claimed in claim 23 wherein the predetermined time period extends up to 24 hours.

a9

26. (Amended) The method as claimed in claim 20 wherein the algorithm is applied at the end of a predetermined time period.

27. (Unchanged) The method as claimed in claim 26, wherein b) further comprises:

a) determining that animal's mean body temperature reading over the predetermined time period;

b) calculating the variance between each measurement taken under a) and the mean determined; and

c) adding all variances to obtain the cumulative temperature variance score.

a10

28. (Amended) The method as claimed in claim 20 wherein the algorithm is applied progressively.

29. (Unchanged) The method as claimed in claim 28 wherein the algorithm is applied progressively as each measurement corresponding to body temperature is taken.

a11

30. (Amended) The method as claimed in claim 28 wherein c) is conducted after each application of the algorithm.

31. (Amended) The method as claimed in claim 20 wherein c) comprises comparing the results of the algorithm to a predetermined threshold and further, in the event of the threshold being exceeded, providing an indication of the threshold being exceeded.

32. (Unchanged) The method as claimed in claim 31 further including setting the animal aside for at least a predetermined animal withholding period in the event of the threshold being exceeded.

a12

33. (Amended) The method as claimed in claim 28 wherein a mean is calculated progressively as each measurement corresponding to temperature is taken.

34. (Amended) The method as claimed in claim 28 wherein the algorithm comprises:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1, 0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

35. (Amended) The method as claimed in claim 20 wherein the measurements are taken on the outer part of the animal's body.

36. (Amended) The method as claimed in claim 35 wherein skin temperature measurements are taken and compensation is provided for at least ambient temperature or solar radiation.

---

37. (Unchanged) The method as claimed in claim 35 wherein measurements are taken in the ear canal of the animal.

---

38. (Amended) A method of measuring stress levels in an animal, the method comprising measuring the animal's pH level using a method of claim 1, a pH level greater than 5.8 to 6.2 indicating a stressed animal.

39. (Amended) A method of providing an indication of meat quality in an animal, the method comprising:

a) obtaining measurements corresponding to a body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a), which algorithm cumulatively takes account of variations in body temperature over time; and

c) comparing the results of the algorithm to a predetermined threshold.

40. (Amended) A method of providing an indication of meat quality in an animal, the method comprising:

a) obtaining measurements corresponding to a body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a), which algorithm cumulatively takes account of variations in body temperature over time; and

c) correlating the results of the algorithm with a meat tenderness standard.

41. (Amended) The method as claimed in claim 39 wherein ten or more measurements corresponding to body temperature are taken.

42. (Amended) The method as claimed in claim 39 wherein the measurements are taken for a predetermined time period.

43. (Unchanged) The method as claimed in claim 42 wherein the predetermined time period is at least 12 hours.

44. (Unchanged) The method as claimed in claim 42 wherein the predetermined time period extends up to 24 hours.

a14 45. (Amended) The method as claimed in claim 39 wherein the algorithm is applied at a end of the predetermined time period.

46. (Unchanged) The method as claimed in claim 45, wherein b) further comprises:

determining that animal's mean body temperature reading over the predetermined time period;

calculating the variance between each measurement taken under a) and the mean determined; and

adding all variances to obtain the cumulative temperature variance score.

a15 47. (Amended) The method as claimed in claim 39 wherein the algorithm is applied progressively.

48. (Unchanged) The method as claimed in claim 47 wherein the algorithm is applied progressively as each measurement corresponding to body temperature is taken.

a16 49. (Amended) The method as claimed in claim 47 wherein c) is conducted after each application of the algorithm.

50. (Amended) The method as claimed in claim 39 wherein c) comprises comparing the results of the algorithm to a predetermined threshold and further, in the event of the threshold being exceeded, providing an indication of the threshold being exceeded.

51. (Unchanged) The method as claimed in claim 50 further including setting the animal aside for a predetermined animal withholding period in the event of the threshold being exceeded.

a17 52. (Amended) The method as claimed in claim 47 wherein a mean is calculated progressively as each measurement corresponding to temperature is taken.

53. (Amended) The method as claimed in claim 47 wherein the algorithm comprises:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1, 0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

54. (Amended) The method as claimed in claim 39 wherein the measurements are taken on the outer part of the animal's body.

A17 cont'd

55. (Amended) The method as claimed in claim 54 wherein skin temperature measurements are taken and compensation is provided for at least ambient temperature or solar radiation.

56. (Unchanged) The method as claimed in claim 54 wherein measurements are taken in the ear canal of the animal.

09830145 .042001

57. (Amended) A system for providing an indication of meat quality in an animal to be slaughtered, the system comprising:

a body mountable measurement device for obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals over a period of between 3-36 hours; and

a processor having input means for receiving the measurements from the measurement device, the processor operable to implement an algorithm to the measurements, which algorithm cumulatively takes account of variations in body temperature over time, wherein the processor has output means for providing the result of the algorithm.

58. (Amended) The system as claimed in claim 57 wherein the algorithm comprises the following:

determine the animal's mean body temperature from the measurements;

calculate the variance between each measurement and the mean; and

add all variances to obtain a cumulative variance score.

59. (Amended) The system as claimed in claim 57 wherein the algorithm comprises the following:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the *instantaneous* ambient air temperature;

d is the *difference* between ear and ambient temperatures;

fast is the *fast*-response filter element;

slow is the slow *response* filter element;

v is the integral of *the* difference between the two filter elements;

c_1 is the time *constant* of the fast filter;

c_2 is the time *constant* of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1$, $0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

a18 60. (Amended) The system as claimed in claim 57 wherein the system is embodied in an all-in-one indicator device.

61. (Unchanged) The system as claimed in claim 60 wherein the device is provided in the form of an ear tag.

62. (Unchanged) The system as claimed in claim 61 wherein the tag incorporates the measurement device.

a19 63. (Amended) The system as claimed in claim 57, wherein the processor is provided by way of a remote computer.

64. (Amended) The system as claimed in claim 57 wherein the processor is adapted to output a numeric value from a comparison with a meat tenderness scale.

65. (Amended) The system as claimed in claim 57 wherein the processor is operable to compare the output of the algorithm to a predetermined threshold.

66. (Unchanged) The system as claimed in claim 65 further including an indicator to indicate where the output of the algorithm has exceeded the predetermined threshold.

67. (Unchanged) The system as claimed in claim 66 wherein the indicator is also operable to provide an indication that the system is functioning.

68. (Amended) A system for indicating cumulative stress in an animal, the system comprising:

a body mountable measurement device for obtaining measurements corresponding to outer body temperature of the animal at periodic time intervals over a period of between 3-6 hours; and

a processor having an input to receive measurements from the measurement device, the processor operable to implement an algorithm to the measurements, which algorithm cumulatively takes account of variations in body temperature over time, wherein the processor has an output for the result of the algorithm.

69. (Amended) The system as claimed in claim 68 wherein the algorithm comprises the following:

determine the animal's average body temperature from the measurements;

calculate the variance between each measurement and the average; and

add all variances to obtain a cumulative variance score.

70. (Amended) The system as claimed in claim 68 wherein the algorithm comprises the following:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1$, $0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

71. (Amended) The system as claimed in claim 68 wherein the system is embodied in an all-in-one indicator device.

72. (Unchanged) The system as claimed in claim 71 wherein the device is provided in the form of an ear tag.

73. (Unchanged) The system as claimed in claim 72 wherein the tag incorporates the measurement device.

74. (Amended) The system as claimed in claim 68 wherein the processor is provided by way of a remote computer.

75. (Amended) The system as claimed in claim 68 wherein the processor is adapted to output a numeric value or comparison with a meat tenderness scale.

76. (Amended) The system as claimed in claim 68 wherein the processor is operable to compare the output of the algorithm to a predetermined threshold.

77. (Unchanged) The system as claimed in claim 76 further including an indicator to indicate where the output of the algorithm has exceeded the predetermined threshold.

78. (Unchanged) The system as claimed in claim 77 wherein the indicator is operable to indicate that the system is functioning.

79. (Amended) A system of indicating pH in an animal, the system comprising:

a body mountable measurement device for obtaining measurements corresponding to outer body temperature of the animal at periodic time intervals over a period of between 3-6 hours; and

a processor having an input to receive measurements from the measurement device, the processor operable to implement an algorithm to the measurements, which algorithm cumulatively takes account of variations in body temperature over time, wherein the processor has an output for the result of the algorithm.

80. (Amended) The system as claimed in claim 79 wherein the algorithm comprises:

determine the animal's average body temperature from the measurements;

calculate the variance between each measurement and the average; and

add all variances to obtain a cumulative variance score.

81. (Amended) The system as claimed in claim 79 wherein the algorithm comprises:

where:

t_{ear} be the instantaneous ear temperature;

$t_{ambient}$ be the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1, 0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

a22 cont'd

82. (Amended) The system as claimed in claim 79 wherein the system is embodied in an all-in-one indicator device.

83. (Unchanged) The system as claimed in claim 82 wherein the device is provided in the form of an ear tag.

84. (Unchanged) The system as claimed in claim 83 wherein the tag incorporates the measurement device.

a23

85. (Amended) The system as claimed in claim 79 wherein the processor is provided by way of a remote computer.

86. (Amended) The system as claimed in claim 79 wherein the processor is adapted to output a numeric value from a comparison with a meat tenderness scale.

87. (Amended) The system as claimed in claim 79 wherein the processor is operable to compare the output of the algorithm to a predetermined threshold.

88. (Unchanged) The system as claimed in claim 87 further including an indicator to indicate where the output of the algorithm has exceeded the predetermined threshold.

89. (Amended) A temperature sensing device comprising:

a tag having an attachment portion to extend through a body part of an animal, the tag incorporating an indicator; and

one or more animal temperature sensors disposed on/in the attachment portion for contact with the animal during use.

90. (Unchanged) The tag as claimed in claim 89 wherein the tag is an ear tag.

91. (Amended) The tag as claimed in claim 89 wherein an ambient temperature sensor is also provided on the tag.

92. (Amended) The tag as claimed in claim 89 wherein comparison means is provided for comparing the ambient temperature with the animal temperature.

93. (Amended) The tag as claimed in claim 92 wherein the indicator is disposed on the tag, the indicator being responsive to the comparison means.

94. (Amended) The tag as claimed in claim 89 wherein the tag comprises a one piece molded body.